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30 MAY 1976

TRANSL  
22727

695104

TT 77-53040

4101

From: Visnyk Silskohospodar Nauk, Vol. 5, 1971,  
pp. 102-105.

U.S. DEPT. OF AGRICULTURE  
NATIONAL ANIMAL DISEASE FOUNDATION

MAR 25 1976

RECEIVED

2501

Shcherbyna, O.K.

2001

2021

ON THE EPIZOOTOLOGY OF FMD IN THE UKRAINE CAUSED  
BY VIRUS A<sub>22</sub>. Do pitannya epizootologi yashchura  
na ukraini viklikanogo virusom A<sub>22</sub>.

Translated from Ukrainian

Prepared for the Animal and Plant Health Inspection Service,  
United State Department of Agriculture and National Science  
Foundation, Washington, D.C. by Saad Publications  
(Translations Division), Karachi, Pakistan.

1978.



ON THE EPIZOOTOLOGY OF FMD IN THE UKRAINE CAUSED BY VIRUS A<sub>22</sub>.

VISNYK SILSKOHOSPODAR NAUK, in Ukrainian, Vol. 5, 1971, pp. 102-105.

(Article by Shcherbyna, O.K.).

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The foot and mouth disease, caused by A<sub>22</sub>, was first introduced into the Ukraine from the bordering regions of the RSFSR, in the Autumn of 1965. During a fairly short period of time this epizootic spread to many regions of the Ukrainian SSR. In 1966, the foot and mouth epizootic continued to spread throughout the Republic, causing fresh outbreaks; in 1967, the epizootic decreased substantially, but by 1968 - 1969 there were still some epizootic flare-ups of foot and mouth disease in the Ukrainian Republic.

The scientists of the Department of Epizootology and parasitology of the Ukrainian Order of the Red Banner of Labor Agricultural Academy, carried out a detailed study of the foot and mouth epizootic caused by A<sub>22</sub> virus. Their investigations included collections of data for study by scientists. This data was obtained from a survey of 187 farms during the epizootic and after the epizootic was over ( farms being selected according to their representative character). The data thus obtained was analysed and tested by the Scientists. On the basis of these studies definite conclusions have been reached.

This article outlines a series of basic problems of foot and mouth epizootic, caused by A<sub>22</sub> virus.

#### THE AGE-WISE SUSCEPTIBILITY OF VARIOUS KINDS OF ANIMALS.

At the commencement of the epizootic (1965-1966) foot and mouth disease attacked mainly cattle, a few pigs and a very few sheep also. By 1967-1968, the number of pigs that became victim to foot and mouth disease had increased appreciably. At the same time, it was observed that the epizootic flare-up among these types of animals occurred mostly on farms where many cattle, had in the past, contracted foot and mouth disease.

Analysis of the data obtained, established that the most susceptible animals in farms to foot and mouth disease are first



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The scientists of the Department of Epidemiology and Prevention of the Ukrainian Order of the Red Banner of Labor Agricultural Academy, carried out a detailed study of the foot and mouth disease caused by FMD virus. Their investigations have included collection of data for study by scientists. This data was obtained from a survey of 187 farms during the epidemic and after the epidemic was over (farms being selected according to their representative character). The data thus obtained was analyzed and tested by the scientists. On the basis of these studies definite conclusions have been reached.

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#### THE AGE-WISE SUSCEPTIBILITY OF VARIOUS KINDS OF ANIMALS.

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cattle, next pigs and last of all sheep.

The data collected in the Ukrainian SSR compared very favorably with the data obtained in the Belorussian SSR, where during the foot and mouth epizootic, 65.2% of mature cattle had developed this disease, 33.9% pigs had been attacked and only 0.9% sheep had contracted foot and mouth disease, from among the total number of animals attacked by the epizootic.

Age-wise, it was found that animals of all ages were equally susceptible to this disease, caused by the A<sub>22</sub> virus, but the young and new born stock, were specially susceptible.

#### SEASONS MOST FAVORABLE FOR THE SPREAD OF FOOT AND MOUTH DISEASE.

The most favorable period for the propagation of foot and mouth disease in animals, has been observed to be the autumn-winter months, this was evident by the commencement and immediate spreading of the foot and mouth epizootic in 1965. In the Khmel'nic'kij region, the foot and mouth epizootic had reached its peak in the spring (March-May) and Autumn (September-November) 1966-1967.

According to the testimony of S.G. Poplaukhin (1968), the foot and mouth epizootic in the Altai Territory during 1949-1952 and again from 1955 to 1956 had reached its highest peak in the winter months. The same theory, that foot and mouth disease is more rampant in the winter and autumn periods of the year, has been observed by S. Sh. Shaltikov (1961). N. N. Gizitdinov (1961), I.O. Dmitrov (1961) and S. K. V'yatkin (1961).

V. I. Kindyakov (1970) states, that the epizootic flare-ups of foot and mouth disease in KAZAKHISTAN, in 77% of cases out of the total number occurred during the autumn-winter periods of the year, after massive cattle drives.

In our opinion, the substantial propagation of foot and mouth disease in the Ukraine during the autumn-winter months may be explained by the fairly high stability of A<sub>22</sub> virus in lower temperatures and the various means by which foot and mouth infection can be spread. In particular, the latter was assisted by large movement of people and transport, in the autumn for preparation and transportation of farm products, animal drives by Sovkhoses and Kolkhoses ( State and Collective farms in USSR ) to the meat-packing plants, stables for feeding and "Zagotskot"--( "State purchase" ) and in the spring period ( this is for the Khmel'nic'kij region ), it is also probably the result of field operations. And finally, insufficiently effective protective measures to combat the foot and mouth infection ( organization, quarantine-limits, veterinary attention, immunization of animals, etc. ) have also had their influence on the spreading of the foot and mouth disease. During the summer months, the virus is very much



inactivated by the sun's rays, thus explaining a fewer occurrences of foot and mouth disease in animals during these periods of the year as compared to the autumn and winter months.

#### SOURCES OF INFECTION AND MEANS OF PROPAGATION.

The main sources of the disease are sick animals and those that have recovered from an attack of the foot-and-mouth virus, as well as, the products and raw materials obtained from such animals, and the contaminated media of their environment (such as barns, farm lands, pasture grounds, water, etc.). The carriers of foot-and-mouth infection can be humans, transport, infected house pets, wild animals and birds, which have visited a foot-and-mouth disease center.

While studying the epizootic flare-ups of foot-and-mouth disease in fresh farms and settlements, which had no previous record of such epizootic areas at great distances from disease centers (sometimes as much as hundreds of kilometers), we did not find even one case where an animal affected by the foot-and-mouth disease, had passed-on the disease directly. In the greater number of cases (70%), the infection was transported by humans, who were present in the foot-and-mouth disease center and assumed the role of carriers of the virus to far away regions. Thus, the foot-and-mouth virus was introduced into the VINITSKAYA region from the foot-and-mouth center in Rastov, Kiev region, and from the Sums'kaya region such an infection was carried to the Zhitomir'skij regions. In most cases in fact it was because timely measures had not been undertaken in the foot-and-mouth center, namely, veterinary, hygiene check posts had not been set up to carry out the required checking of persons who had been present in the region of the foot-and-mouth center, formalin-steam chambers had not been set up to disinfect personnel and upper clothing, special uniforms, shoes, etc. The second reason for the spread of the foot-and-mouth infection (14%) was, according to our data, transport vehicles, mainly of the autocar types, which were not checked by veterinary check posts, because of non-availability of such check posts at the time, these vehicles were not always properly disinfected while leaving the farms where the foot-and-mouth center, was located.

Very often (in 4% of the cases) the foot-and-mouth infection was caused by milk products which were not properly treated at the dairies and were products of animals which developed foot-and-mouth disease later. This milk was used to feed the calves and young pigs in farms which had remained unaffected by the virus. The infected milk and other milk products were especially harmful because the very young calves and young pigs generally had very low resistance to the foot-and-mouth virus, which in such cases, occur in a non-aphthous (septic) condition, resulting in a large number of deaths among the young ones. That is usually the reason



why a correct diagnosis of the foot and mouth disease has often been delayed in newly born calves and pigs, consequently, the farms cannot commence to take the necessary timely measures to combat foot and mouth infection, thereby allowing the virus, time to attack full grown animals.

The spread of foot and mouth disease through milk products, is characterized by the fact that the infection has usually been transmitted to farms where a particular milk dairy is operating. In fresh out-breaks of foot and mouth disease, in farms, where the infection has been transmitted through milk products, as a rule, the infection first starts attacking calves and piglets. In the transmission of foot and mouth infection through milk products, even one farm which has been attacked by the foot and mouth disease, is sufficient to spread the disease to others as yet unaffected, because of a dairy which had not carried out the necessary purification of the milk.

As far as the role of products of animal farms themselves, in the spread of foot and mouth infections, we have not established a single case where the virus was transmitted to such distant regions.

Very often, foot and mouth virus is transmitted to farms, which have not so far been affected by the disease, through water, specially rivers. Thus, during a foot and mouth epizootic in many farms of the Republic, fresh outbreaks in farms which have not so far been affected by the virus were observed by veterinary specialists in regions which were connected by river waters. The data collected by our Scientists indicated four cases, where the epizootic foot and mouth flare-ups had occurred in farms which were situated down stream at distances of 6 to 18 km, from the source of the foot and mouth infection and where the cattle continued to be watered untill such time as the foot and mouth disease became evident in these animals.

Excreta and Urine play a very important role in the spread of foot and mouth infection. According to our data, 4% of foot and mouth infections has resulted from excreta and urine of diseased cattle. It has been established that during the cold weather, the foot and mouth virus remains virulent in the excreta for a period of 150 to 168 days, hence the excreta and urine should be considered as very important agents in keeping the infection alive in outer media. If it is taken into consideration that during the winter months, it is practically impossible to render harmless the excreta of cattle suffering from foot and mouth disease or to completely disinfect the grazing lands of the animal farm in the grip of foot and mouth disease, then the importance of the excreta and urine in the propagation of the disease acquires even more significance.

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Sometimes, during the foot and mouth epizootic in the Ukraine, the unaffected farms, situated at long distances from the affected regions, were known to have been attacked by the virus as a result of transmission of the infection through forage ( hay, green fodder, etc.).

A definitely active role was played in transmission of the virus from regions infected by foot and mouth disease to unaffected farms by animals which were immune to this infection ( namely cats and dogs ) as well as, wild birds. A case has been known where foot and mouth infection was introduced into a farm, so far free from the infection, by rocks during the winter period. This has been proved by the fact that a very heavy snow fall in this particular farm area had completely cut it off from the surrounding inhabited regions, in other words, the only possible source of the foot and mouth infection was the rocks.

Literature has given a lot of information which proves that the Artiodactyla plays an important role in the propagation of foot and mouth disease.

In one of the farms of the Sumskaya regions, V. P. Litvin ( 1968 ) observed a case where foot and mouth infection was transmitted through a sick moose, which before the infection was discovered, grazing for some time with a group of young cattle in a pasture, S. I. Dzhupin ( 1965 ) also mentions the importance of wild Artiodactyla in transmitting the foot and mouth infection in the Novosibirsk regions.

The protracted virulence of foot and mouth virus and the active virus carried animals who had been affected by the disease, is a very important factor in the spread of the infection. Thus, according to the data of O. L. Skomorokhov ( 1952 ), a foot and mouth virus was observed in the urine of an animal 146 days after it was proclaimed clinically free of the disease. S. I. Dzhupin ( 1965 ) informs us that animals which had developed the foot and mouth disease were carriers for a period of 3 to 12 months after they were considered clinically healthy.

In our estimations, 7% of the foot and mouth epizootic cases were caused by animal virus carriers. The extended period of infection, due to the foot and mouth infection in some farms of the Khmel'nic'kaya region may be explained by the fact that stock which had suffered from the disease was mixed with groups of mature cattle which had not been affected so far. It has been established that the animals which had recovered from the foot and mouth disease remained carriers of the virus for a period of 17 to 18 months. Thus, the cause of the foot and mouth disease in 1967 among the animals of the Derazhnyanskaya department of the "Zagotskotvidgodivlya" ("State purchasers of animal food") (Vinnichnij region), were pigs brought in for fattening from the



Kolkhose, named after Petrovskij, which had been attacked by the foot and mouth disease as far back as March, 1966. In the Khar-kovitz section of the Starosinyav'skij beetroot farm, the mature cattle had contracted foot and mouth disease, 17 months after the previously infected animals had been clinically cleared of the disease. The source of the infection was animal - virus carrier of the same Sovkhose. The data collected by us proves that the animals which had suffered from foot and mouth disease should not be mixed with healthy animals for at least 1.5 to 2 years after being clinically cleared of the disease.

Sometimes the cause of fresh outbreaks of foot and mouth disease, caused by A22 virus in farms so far unaffected by the disease, at the commencement of the foot and mouth epizootic in the Ukraine, was the lymph of foot and mouth vaccine, which had an excessive residual virulence.. Therefore after animals were vaccinated in farms which were unaffected by the disease, very often fresh foot and mouth outbreaks were observed.

According to our ( epizootological ) data, the virus carriers and virulence which is sometimes active for approx. 17 to 18 months in animals which had developed foot and mouth disease is an ever present danger.

The study of the epizootological nature of the animal farms have shown that foot and mouth epizootic in the Ukraine, caused by the A22 virus, ( 1965-1966 ), travelled with lightning speed. Later, with every passing year, the force of the epizootic was reduced, till finally the epizootic foot and mouth disease was observed only as individual outbreaks. A deciding role in putting an end to foot and mouth epizootic in the Ukraine, was the complex of anti-foot and mouth disease protective measure ( such as quarantine, veterinary, hygienec, etc. ) but, first and foremost the method of immunization of animals susceptible to foot and mouth infection.

known, named after Petrovskiy, which had been affected by the  
t and mouth disease as far back as 1900. In 1905, the  
a section of the Petrovskiy district, the disease was  
the had contracted foot and mouth disease, the disease  
viciously infected animals had been clinically observed of  
case. The source of the infection was a local - with  
the name Savchuk. The data collected by the Petrovskiy  
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mixed with healthy animals for at least 10 days, and  
ing clinically cleared of the disease.

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